TRAFFIC ENGINEERING

OFFICIAL PUBLICATION OF THE INSTITUTE OF TRAFFIC ENGINEERS

COVER: A section of the existing expressway in Los Angeles. Plans for future park- and expressways in Los Angeles are presented in Mr. Aldrich's article in this issue. (Photo courtesy California Dept. of Public Works.)

May We Offer . . .

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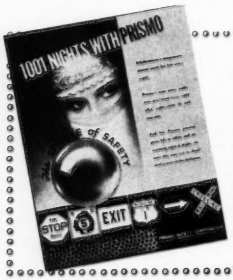

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Frankly Speaking

The associations sponsoring the traffic survey of the Chicago central business district are to be commended for contracting for an "action" study. The contract requires the traffic engineering consultants not only to collect factual data and make recommendations for improvements, but also to aid in obtaining public support and financial assistance in materializing the recommendations.

In the early stages of the traffic engineering profession, many city and state traffic engineers were forced to become proficient in public relations. This was prompted by the closer connections the tools of traffic engineering had with the public. Many public-spirited citizens were prone to instruct traffic engineers where to place their signs and signals. These demands mounted to such proportions that in a number of cases city traffic engineers had to hide at night and on Sunday in order to accomplish their routine functions. Little time was left for pure research.

As the profession grew and more trained personnel became available, substantial contributions in research were made. As a result, traffic engineers have had an opportunity to become reasonably well equipped to do a professional job involving so many human factors.

The consultants retained for the Chicago study will have an opportunity to exploit all phases of a profession requiring that sound technical practices be translated for public acceptance. Here will be developed a lesson in believing what you say and doing what you believe. Here the dust will not collect on an elaborately prepared report, discarded because public support could not be obtained to show the practical application of the recommendations.

Again may we commend the Chicago associations for utilizing all the resources of a traffic engineer.

Robert O. Swain

Editor

Columbus Plans Parking Garage

by H. G. Eckhardt, *Mem., I.T.E.*

Columbus, Ohio, like so many other mid-west American cities, has found itself in the unenviable position of having its streets choked with moving traffic and lined with stationary automobiles. So much of its valuable street area is now consumed by curbside parking that an insufficient amount of space remains for its moving loads. Yet, to date, no formal steps have been taken to provide municipally operated off-street terminal facilities.

In the midst of a dilemma as to how to legally provide the needed off-street space, a wave of good fortune struck. It was publicly announced that the Civilian Production Administration had authorized the F. and R. Lazarus Company, a leading department store, to construct a modern multi-deck parking garage within the area where the need for off-street parking is greatest.

When, during consideration by CPA, the administrative officials of the city were asked for an opinion as to the necessity for such a facility, they replied by submitting a report prepared by the writer in which he had recommended three general steps as follows:

1. That the City, along with organized civic groups, support pending enabling state legislation which would permit Ohio cities to purchase or lease land for the operation of off-street parking space.
2. That private business, either individually or cooperatively, be supported in their efforts to ease the parking problem by providing suitable off-street space.
3. That funds be set up to provide the accumulation of facts upon which to base a program for off-street termini for the city's motoring public.

Authorization to the Lazarus Company to construct a building for off-street parking was predicated upon its usefulness to the public in its effort to combat the well known parking problem.

The architect's perspective accompanying this article (Figure 1) shows the open-sided structure that is now under construction. It embodies virtually all of the most modern features of what the traffic engineer considers good design of a parking garage. Its ramps (on a grade of approximately 5%) and its superelevated turns permit an attendant to quickly and safely deliver an automobile to any of the various levels. It should be pointed out that the parking levels on the front and back portions are staggered, thus making each successive level a half-story above the other.

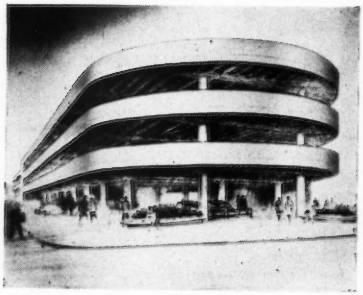


FIGURE 1
New Parking Garage

Mr. Eckhardt is Assistant Chief Engineer, Division of Traffic and Safety, Ohio Department of Highways, Columbus Ohio.

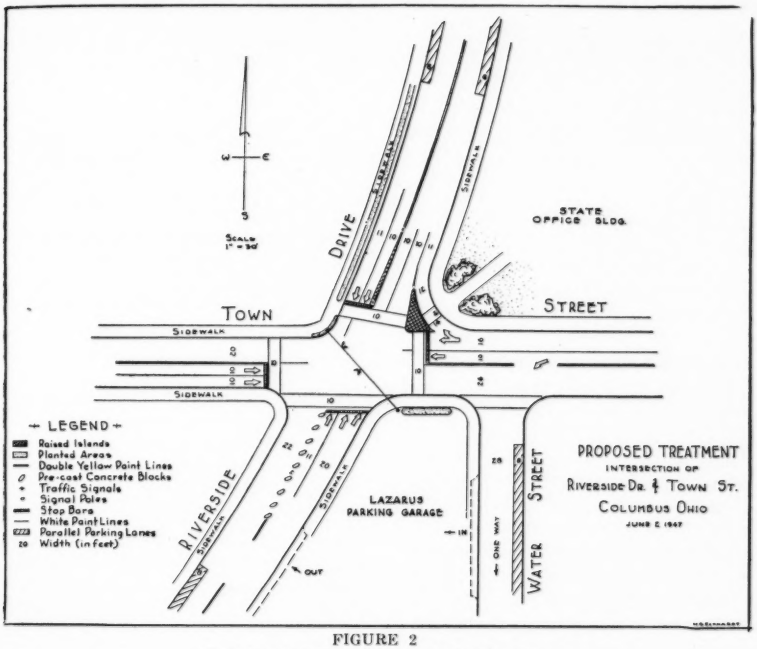


FIGURE 2
Redesign for Riverside Dr. and Town St.

To allow attendants to return to the ground level quickly, a series of slide poles with rubber landing mats at the bottom are provided. Vertical mechanical transportation has been designed to raise attendants rapidly from the ground floor to any of the parking levels.

The building will provide 758 car berths with a possible capacity of 1014 vehicles if aisle room is utilized. Adequate waiting room space and checking facilities will be available on the ground floor along with fuel, tire, lubrication and washing service for customers of the garage.

Increased traffic activity in and about the area served by this modern, useful terminal brings the realization of the need for and the preparation of plans for further modern traffic control measures. Among these is the proposed redesign of a presently "wide-open", busy intersection directly in front of the new parking garage. The traffic control measures included in the plan (Figure 2) have been designed to reduce the area of conflict and to channelize traffic flow with very little attendant expense to the city.

It is anticipated that the full import of designing for the efficient handling of moving traffic and for adequate terminal facilities will be recognized and approved by the motoring public. It is also probable that it will generate a public demand for still further traffic engineering advances for Ohio's capital city.

Night Reflectance of Traffic Paints and Signs

by RICHARD S. HUNTER

IT is by reflected light that the driver on the highway sees painted traffic lines, traffic signs and, in fact, everything except actual sources of light. Thus reflecting power is a quantity of practical interest to the traffic engineer. Of special interest is reflecting power for the conditions of night operation. It is at night when the driver has only a limited range of view that he must place his chief reliance upon traffic signs and markings. When these markings have good night reflectance, they stand out in contrast to their surroundings and attract attention to their message.

A new instrument has been developed to measure the directional reflectances of traffic paints and traffic signs for the geometric conditions of night use. This instrument is portable and can be used in the field as well as in the laboratory. Figure 1 shows the new instrument being used to measure the night reflectance of a "reflectorized" traffic sign. Measurements may be made outdoors during the day to evaluate performance at night.

Reflectance Defined

A value of reflectance is a ratio of light reflected by a specimen to the light incident on it. The traffic engineer is not interested in all the light reflected by a sign or marking specimen, but only in that part reflected toward the eyes of the motorist. The scale used to measure reflecting power in specific directions is the scale of directional reflectance. A value of directional reflectance always applies to specific directions of illumination and view. It is the factor relating the brightness that the specimen has under these conditions to the brightness that the ideally-diffusing, completely reflecting white would have under the same conditions. In other words, the imaginary perfect white is the standard of directional reflectance. This imaginary standard is completely lacking in gloss and if illuminated in any manner, it would appear to have the same brightness from all directions of view.

Real specimens, of course, vary in brightness as directions of view or directions of illumination are changed. In directions in which specimens appear brighter than the ideal white, as in highlights due to gloss, measured values of directional reflectance exceed unity. "Reflectorized" materials and traffic paints designed for high night brightness have high directional reflectances exceeding unity for the conditions of night use. The new Night Vivisibity Meter measures directional reflectance (symbol Rd) for the geometric conditions of night illumination and observation of traffic paints and signs. The instrument scale is graduated from 0.2 to 1000.

The illuminating engineer assumes a perfect diffusor when he speaks of reflectance. Therefore the directional reflectance scale fits directly into his photometric terminology. Directional

Mr. Hunter is Chief Optical Engineer, Henry A. Gardner Laboratory, Inc., Bethesda 14, Maryland.

FIGURE 1
Night Visibility Meter being used in daytime to measure night reflectance.

FIGURE 2
Measuring the nighttime directional reflectance of a painted center line.

reflectance is the factor relating the illumination on a surface to its brightness under the specific conditions of illumination and view:

$$B = E\,Rd$$

If illumination, E, on the surface is given in foot candles, then brightness, B, according to this equation is given in foot lamberts. If illumination is lumens per square centimeter, then brightness is given in lamberts.

As the night source of illumination, the traffic engineer has the head lights of an automobile for which he may have a value of beam intensity expressed in candle power. To find the brightness of a reflecting surface when its directional reflectance and the intensity of the beam incident upon it are known, one uses the following equation in which the cosine on the angle of incidence is a factor:

$$B = \frac{I\,Rd\,\cos i}{d^2}$$

where I is the intensity of the beam in candle power and d is the distance of the reflecting sample from the source.

At night a sign is illuminated almost perpendicularly, but a traffic paint on the pavement is illuminated at a near grazing angle; thus a sign with a directional reflectance of 1 will appear twenty to forty times as bright as a traffic paint having a directional reflectance of 1. This is because the traffic-paint surface nearly tangent to the direction of the incident beam receives only a small amount of light flux on each unit of surface area.

This tendency of surfaces to lose brightness as angle of incidence approaches grazing is partially compensated for in good traffic paints by values of directional reflectance well over unity. Nevertheless near-horizontal pavement surfaces are in general less bright at night than vertical sign surfaces facing the oncoming light.

Night-Visibility Meter

The new Night-Visibility Meter is a visual instrument operating on the equality of brightness principal. As is shown in figure 2, the instrument is placed upon a traffic-paint surface for test. A sign surface, on the other hand, is held at the end of the instrument in the manner shown in Figure 1.

Being a visual instead of a photoelectric instrument, the new device differs from most of the photometric instruments which have been developed in the past several years. Photocells, although convenient and rapid for most reflectance measurements, are not adapted for operation in an instrument with beams as nar-

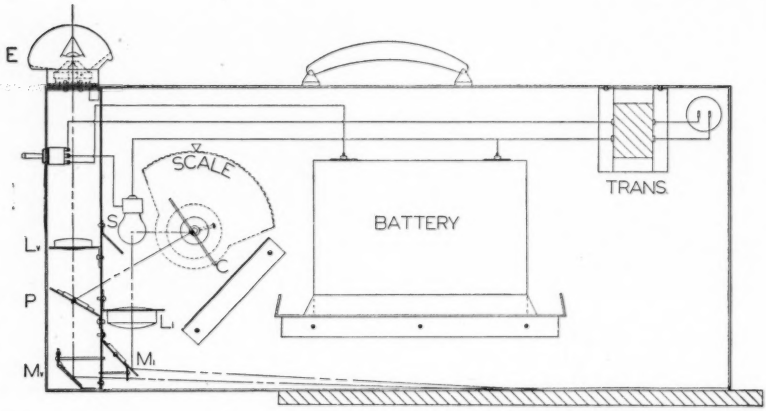


Figure 3—Diagram of Night Visibility Meter: S—lamp, Li and Lv—lenses, Mi and Mv—mirrors, E—eyepiece, P—pattern mirror, C—comparison surface which rotates with scale.

row as those required for geometric duplication of the conditions of night illumination and observation of traffic materials.

A diagram of the new instrument mounted on a long traffic-paint panel is shown in Figure 3. Inside the instrument, a six-volt automobile lamp (S) is used as the source, a projection lens (Li) and a mirror (Mi) direct a nearly parallel beam of light from this lamp toward the sample panel. This beam intersects the surface of the sample at an angle which averages 2.9° from tangent (87.1° from normal). The operator looks at the illuminated area of this panel from the upper left-hand corner of the instrument through an eyepiece (E), a lens (L), a slit in the pattern mirror (P), and a reflecting mirror (Mv). The viewing beam from the operator's eye intersects the illuminated sample surface at an angle averaging 1.7° from tangent (88.3° from normal).

Looking through the eyepiece, the operator sees a narrow slit of light from the panel surrounded by a circular area of light reflected in the pattern mirror (P) from the illuminated comparison panel (C). The appearance of this instrument field is shown in figure 4. The comparison panel (C) may

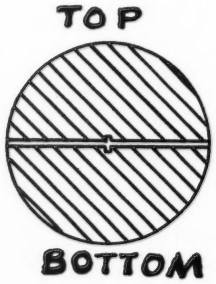


Figure 4—Appearance of instrument field showing narrow slit of light reflected from test sample surrounded by light from comparison surface.

be rotated by the operator around its central horizontal pivot. It is coated with a special aluminum varnish and as it rotates this aluminum varnish varies in brightness. When facing the lamp, the panel appears quite bright, but when turned to a nearly horizontal position it appears dark.

The operator makes each reflectance setting by turning this comparison

panel until its brightness seen in the instrument field exactly equals the brightness of the narrow strip of traffic paint seen in the central strip. A drum outside the instrument box rotates with the comparison panel and carries the reflectance scale which indicates to the operator the reflectance of the sample corresponding to any balance setting. Various operators experience no trouble in duplicating readings of directional reflectance to one part in five.

Angle of Viewing

The angles 2.9° and 1.7° from tangent are respectively those at which the drivers' line of sight and the headlight beam intersect the surface of a level pavement 100 feet ahead. These are the angles selected by the designer of apparatus described by Mattimore in 1926[1]. According to Mattimore, this apparatus was developed at the New Jersey Zinc Co. It has since been duplicated in several laboratories, but so far as the writer knows it has not been modified so that it may be taken into the field.

In the new instrument, the angles at which the illuminating and viewing beams intersect a traffic-paint surface have been interchanged from those of the actual traffic situation. That is, the direction of view in the instrument is the highway direction of illumination, and the direction of illumination in the instrument is the highway direction of view. This reversal does not affect the numerical results of directional reflectance which are provided. Helmholtz, the famous German scientist, was the first to establish the equivalence of reflectometric measurements made with reciprocal geometric conditions, therefore this equivalence is generally known as the "Helmholtz Reciprocal Relation"[2]. Advantage was taken of this relation in building the new instrument because of several useful features which resulted.

FIGURE 5
Checking the night visibility of a 3-year old strip of "reflectorized" material.

To measure traffic signs, a tunnel is first attached to the bottom of the instrument box to shield the illuminating and viewing beams as they emerge through the opening where a traffic-paint sample is located. This tunnel is open at the far end where the beams intersect the sign surface being tested. To measure a sign in the field, the box is mounted on a tripod and held so that the sign is against the end of the instrument as shown in figure 1. One can locate the instrument so that the illuminating and viewing beams strike the sign surface perpendicularly, or they can turn it to measure directional reflectance at 10°, 20°, or whatever angle is desired. In daylight, the observer should probably use black cloth to keep outside light from the area of the sign being measured when working at the non-perpendicular angles.

Reflectance Measurements

Examples of some of the measurements which have been made with the new apparatus are given in the following table. They show how greatly both paints and signs differ from each

1 H. S. Mattimore, Highway Traffic Line (Zone) Paint, p. 180, Proc. 5th Annual Meeting, Highway Research Board, National Research Council (1926).

2 See H. J. McNicholas, Absolute Methods in Reflectometry, Bureau of Standards Journal of Research 1 p. 35 (July, 1928) RP 3.

other in directional reflectance for the geometric conditions of night observation. Normally, "reflectorized" signs and traffic paints have directional reflectances significantly higher than "un-reflectorized" signs and traffic paints. However, there are significant differences between individual samples in all classes of materials. The best "reflectorized" materials are three to four times brighter than the poorest "reflectorized" materials. Similarly the best "non-reflectorized" traffic paints are five or six times as bright as the poorest traffic paints.

It should be pointed out in connection with these numerical results that the values reported for some of the "reflectorized" sign materials are not the highest values of directional reflectance that these materials have. The divergence between the incident beam and the viewing beam in the present apparatus is 1.2°. On the highway with distances between automobile and sign greater than 100 feet, angles of divergence between illuminating and viewing beams are less than this. For these small angles of divergence, the best "reflectorized" sign materials have higher directional reflectances than at 1.2° divergence. Thus the writer recently measured a plastic reflex reflector of the white type reported below. He obtained a directional reflectance of 600 for 0° divergence in contrast to 150 obtained at 1.2° divergence. This divergence effect is not felt to be a serious drawback, however. The new instrument places most of these highly directive, highly reflective materials in correct numerical order relative to other materials.

Typical Results from Night Visibility Meter

	Night-time Directional Reflectance
Non-reflectorized traffic paints	
Paint A—Laboratory panel	9.
—On road (initial)	8.
—On road (after one week)	4.
Paint B—Laboratory panel	1.6
—On road (initial)	2.
—On road (after one week)	2.
Reflectorized traffic-line markings	
Sample Ar	8.
Sample Br	15.
Sample Cr	40.
Non-reflectorized signs	
Clean white sign	0.9
Dirty white sign	0.2
Reflectorized signs	
Glass beaded white sign (laboratory)	16.
Same type sign after year outdoors	8.
Same type sign but splashed with dirt	1.
Glass beaded aluminum (laboratory)	50.
Same type sign after 3 years outdoors	8.
Plastic reflex reflector (white)	150.
Plastic reflex reflector (yellow)	2.00
Plastic reflex reflector (red)	80.

Summary

It is now possible to measure readily and accurately the directional reflectance of traffic signs and traffic paints for the conditions of night use. These measurements can be made either in the laboratory or in the field. With the new apparatus described, it can be shown that marked differences exist in the night visibility of various

traffic paints and traffic signs.

It is now possible to write specifications with numerical night-reflectance requirements for traffic paints and signs. Now also it is possible to put sign and paint maintenance on a scientific basis. The new apparatus may be taken into the field to show when weather and wear reduce night visibility to a point where repainting, cleaning or replacement is required.

MILWAUKEE CONSIDERS EXPRESSWAY PLAN

An elaborate report, suggesting construction of expressways as new traffic arteries in the metropolitan area of Milwaukee, Wis., made jointly by the State Highway Commission of Wisconsin and local governmental units in cooperation with the U. S. Public Roads Administration, was made public recently.

A summary of the 74 page report and the conclusions drawn from it follows:

The Milwaukee metropolitan area, with a population of more than three-quarters of a million, now lacks traffic routes continuous from one part of the area to another that do not transverse heavily congested business streets or streets with impediments to traffic flow.

All such routes at present are surface streets which generally have vehicular and pedestrian cross traffic interference from parking maneuvers; interfering public transit vehicles; vehicular movements across lanes with moving traffic; driveways in and out of abutting properties; and no physical separation of vehicular traffic moving in opposite directions.

Expressway favored.. A 6 lane expressway that would carry traffic volumes in excess of 50,000 vehicles per day, is favored in the report, engineers pointing out that it would take 14 to 18 lanes of surface streets to serve that same traffic. In addition, the handling of this traffic on expressways would result in a very great relief to cross traffic and traffic on adjacent streets, whereas the widening of existing streets would result in no such relief and would increase the cross traffic problem because of wider intersection.

It is by no means certain that the provision of 18 traffic lanes on surface streets would be less costly than the construction of a 6-lane expressway, the report added. Surface street widening, if it extends beyond building lines, frequently involves very large right-of-way expense.

No figures on total cost of the expressway were included, but the report said that approximately $7,000,000 could be made available to the local governments comprising the area for a 3-year modernization program, of which about $6,000,000 would be contributed as a joint federal-and-state-aid fund, and $1,000,000 by the local units.

PREDICTS JAMS

Police of the nation face a traffic jam of unprecedented proportions when motor vehicle registrations return to the pre-war total, Henry K. Evans (Assoc. Mem., ITE), director of traffic engineering for the National Conservation Bureau, accident prevention division of the Association of Casualty and Surety Companies, told police attending the eleventh annual Peace Officers Short Course at Iowa State University.

Even though registrations, now estimated at 33,500,000, are still lower than they were before the war, increased use of motor vehicles has raised traffic volume during the first half of 1947 to the highest level in history, Mr. Evans said. Vehicle mileage has jumped from 9,500 miles per car in 1941 to 10,300 miles per car in 1946.

Los Angeles Plans Parkway System

by LLOYD ALDRICH

Unprecedented continued growth of the Los Angeles metropolitan area both in population and in numbers of automobiles over a period of almost half a century has caused a traffic and transit problem second to none in the United States.

The story of this growth is well told by the following comparative figures:

Year	Population	Registered Automobiles	Persons per Automobile
1910	504,131	36,146	14.0
1920	936,455	180,624	5.1
1924	1,648,670	532,080	3.5
1930	2,190,900	842,528	2.6
1940	2,785,643	1,160,124	2.4
1946	3,704,000	1,424,800	2.6

These show the rapid growth in number of automobiles as compared to population. The present number and concentration of automobiles are the largest to be found in any like area in this country.

Early growth of this area was encouraged on a widespread basis by construction of a county-wide network of interurban electric rail lines largely completed before 1910. Further decentralization of population has been encouraged by the rapid increase in number and use of the automobile as a medium of transportation. Climatic conditions are favorable to the all year use of the motor vehicle so that it is not surprising that the private automobile handles over 80% of the passenger miles of travel in the Los Angeles area.

1970 Estimate Given

It it estimated that there will be 6,000,000 persons and 2,500,000 automobiles in the area before 1970. With mounting congestion from present cars and population it is obvious that the existing street and transit systems will be entirely inadequate to handle the greater loads which will be progressively placed upon them.

The rapid growth of automobiles between 1920 and 1924 caused the City of Los Angeles to adopt a "Major Traffic Street Plan" and set out on a large program of opening and widening streets to relieve the congestion of traffic. The impetus of this plan and the rapid growth of the area has caused approximately $600,000,000 to be spent in the construction of additional city streets, county roads and state highways since that time. While this has provided an excellent system of surface arteries, the traffic demands have increased more rapidly than new or widened arteries have been provided.

Survey of 1937-39

Thus in 1937 it was obvious that something additional of a major nature must be undertaken. City officials and certain civic organizations then began a new analysis of traffic and transit needs with the hope of developing a program which would be successful in improving existing and anticipated conditions. The problem was studied from all angles, especially the standpoint of moving persons rather than vehicles and of moving them in the most effective and acceptable manner possible. Therefore, the facility provided would have to be of benefit to mass transit patrons as well as to automobile riders.

While rail rapid transit was recog-

Mr. Aldrich is city engineer of Los Angeles.

nized as being the most efficient way of transporting people and a complete analysis of the possibility of constructing a rail transit was made, it was recognized that the low density of population and the riding habits of the people were not favorable to its construction at the present time.

A system of grade separated parkways or expressways was shown by the study to offer the best possibilities for meeting all of the particular transit needs of this area for the following reasons:

First, the parkways supplementing the existing street system would provide for smooth non-stop flow of heavy volumes of automotive traffic over the longer distances at relatively high speeds and low accident frequency.

Second, the parkways could also serve as limited express bus routes for the rapid transit needs of large numbers of people. For this purpose it is only necessary to construct special bus ramps and passenger loading facilities at major points along the parkways. If buses are operated so that their number is 5 per cent of the total number of vehicles, the passenger-carrying capacity of the parkways will be doubled at relatively small additional cost.

Third, by widening the center dividing strip between opposing roadways on certain selected routes where demand for transit service will exceed the desirable capacity furnished by buses, it will be possible to provide for the addition of a rail rapid transit line along the parkway route.

The study of 1937-39 resulted in the preparation of a report entitled, "A Transit Program for the Los Angeles Metropolitan Area". The major recommendation of this report was that an immediate start should be made on the progressive construction of a system of grade separated express highways or parkways to be used as the express elements of a modern transit system usable by automobile, bus and rail rapid transit as outlined hereinabove.

Successive review by planning boards, the State Highway Division, the county, the city engineers of communities within the area as well as by the Automobile Club of Southern California and other civic organizations has caused this plan, with some modifications and normal additions to be generally accepted and adopted as the physical plan of parkways to be eventually constructed in the area. There is substantial agreement also as to the priority of construction.

The Parkway Plan

The parkway plan as it has been generally adopted by the various agencies of the metropolitan area is shown in Figure 1. This present plan is a development of the plan presented in 1939 with only such normal additions and modifications as would be made in any plan over a period of years.

One of the predominant movements of traffic is a radial movement converging on the Central Business District of Los Angeles. At the present time, about 650,000 cars enter and leave this district daily. To handle this large movement, it is obvious that a number of radial parkways into the Central District will be required and these have been included in the plan.

Includes Inner Loop

An inner loop of parkways has been included immediately adjoining the central district. This loop has the purpose of distributing traffic to and from the radial parkways. On and off ramps will connect with a series of one way east and west streets to simplify movement of traffic between the parkways and the surface street system.

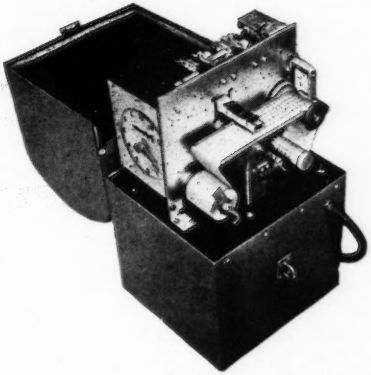
In addition to the heavy radial movement of traffic, there is heavy cross traffic. This cross movement of traffic on the present street system

FIG. 1
Proposed Parkway Plan for Los Angeles.

with its intersections at grade is responsible for the main delays of traffic movement. It has been necessary therefore to provide parkway routes roughly circling the downtown area. Such routes are provided by the Normandie-Slauson Parkways on the west and south, the Allesandro-Colorado-Concord Parkways on the west, north and east.

The heavier traffic districts of the metropolitan area are completely bypassed by the Sepulveda Parkway which enters the area from the northwest and circles southerly and easterly around the outskirts of the City of Los Angeles. The Foothill, Arroyo, Concord and Los Angeles River Parkways form another bypass to the north and east of the central part of the area.

Many of the parkway routes, such



STATE ENGINEERS PLAN FUTURE ROADS WITH

Traficounter

State highway engineers, the original users of Traficounters, have this to say about the value of these precision built instruments in their highway planning.

1. "Our portable traffic recorders are used periodically for traffic counts on urban streets and for determining changes in traffic at scattered points on our rural highways."

2. "Mechanical counting equipment supplies most of the traffic information gathered."

3. "In every case (of planning for new roads and improvement of old roads) the value of traffic plays a very important part in determining the extent of such work and mechanical counting equipment has been found to be essential in economically gathering such data."

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as the Long Beach, River and Colorado Parkways, provide direct interconnections between the many cities and centers of population of the area.

Others provide special service to important facilities such as the Inglewood and Crenshaw Parkways leading to the Los Angeles Airport and the Santa Monica and Venice Parkways leading to the beach playground areas along the shoreline. Because of favorable climate, these beaches are used for a much longer season than in most localities.

The parkway routes included in the overall plan will effectively serve all long distance travel needs of the people of the area. The entire parkway system as shown on Figure 1 includes 613 miles of parkway.

Relief for Streets

It is estimated that with the construction of the complete system of parkways, the surface street system will be directly relieved of approximately 50% of its motor vehicle traffic. An effective rapid transit bus and rail system coordinated with these parkways will tend further to reduce the street traffic. It is therefore believed that except for completing the grid of surface streets in presently undeveloped areas, it will not be necessary to continue an expensive program of opening and widening of surface streets. The parkways, although more expensive to construct per mile, are capable of carrying tremendous traffic loads with safety and with average overall speeds at least twice those attained on surface streets.

The war has delayed the construction of some of the parkway projects which had been previously approved for acquisition and construction. Portions of the parkways completed before or during the war period have proved their worth in carrying war time and post war traffic.

Parkways Completed

The parkway routes, the Hollywood Parkway, Barham Boulevard to Highland Avenue, and the Arroyo Seco Parkway from Glen Arm Street, Pasadena, to Avenue 22, Los Angeles, have been in operation since January 1, 1941. The Arroyo Seco was opened southerly to Adobe Street on December 31, 1943. The Ramona Parkway from Los Angeles River to East City Boundary, while delayed by war restrictions on heavy construction, was completed on August 14, 1944.

Twenty-four hour counts of traffic taken on ordinary week days in February, 1947, recorded a daily traffic flow of 88,277 cars on the Hollywood Parkway and 86,197 cars on the inner section of the Arroyo Seco Parkway. Both of these parkways have separate roadways 4 lanes wide for each direction of travel. Traffic on the Arroyo Seco Parkway during the afternoon peak hour was recorded as 9550, of which 6850 cars were traveling northerly from the central business area on four traffic lanes each 12 feet wide.

Saves Gasoline

These figures show the tremendous capacity of the parkways and their great worth to the community in the handling of traffic. A recent test made by engineers of the Automobile Club of Southern California recorded a gas consumption of only 0.8 gallons for a 16.59 mile round trip on the Arroyo Seco Parkway as compared to 1.3 gallons for a 17.9 mile trip on regular surface thoroughfares. This would indicate a saving of about 5 cents per trip along the 8.3 miles of the present Arroyo Seco Parkway or a tremendous aggregate saving to the many thousands of motorists using the parkway daily.

The safety record of the parkways is also impressive. Analysis of the ac-

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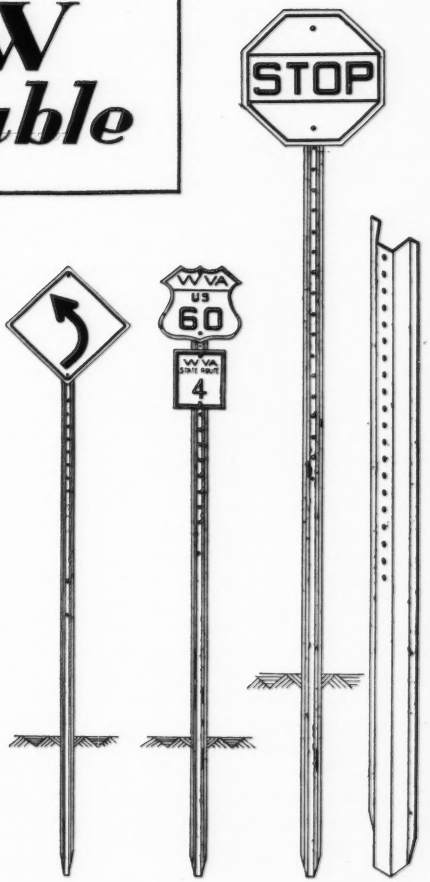

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cident record of the Arroyo Seco Parkway and Wilshire Boulevard and Figueroa Street, two major surface arteries, indicates 5 times and 9 times, respectively, as many accidents per vehicle mile of travel on these streets as on the Arroyo Seco. The favorable effect of the construction of a number of parkways on the accident record of this area can readily be seen.

Construction Program

Parkways authorized for construction at the present time include the Hollywood and Santa Ana Parkways from Vineland Avenue to a point east of the city limits of Los Angeles. These parkways form one of the primary state highway routes through the area and are also units of the federal interregional highway system. Acquisition of rights of way are practically complete and construction of 12 grade separation structures and two miles of these parkways is now under way.

As a north-south unit, construction has been authorized for extending the Arroyo Seco Parkway to a connection with the Hollywood Parkway, then continuing it southerly as the Harbor Parkway to Olympic Boulevard. Plans are being prepared for its further southerly extension.

A 3.7 mile section of the Terminal Island Freeway, a Naval access road project commenced during the war, is under construction to provide better access to large permanent Navy facilities on Terminal Island.

Federal Aid Given

With the exception of the Terminal Island Freeway which is being constructed entirely with federal funds, each of the parkways constructed or authorized for construction has been financed principally from state highway gas tax funds. These are insufficient for the provision of the parkways at a rate in any way commensurate with the need. Additional funds must be made available by legislative action.

Plans are being prepared for the Sepulveda Parkway from Ventura Boulevard to Venice Boulevard, a distance of 11.0 miles. Sufficient funds are available to protect the right of way against any large proposed developments. Plans are also being prepared for the Inglewood Parkway, an important route from downtown Los Angeles, via the Harbor Parkway, to the Los Angeles Airport.

Preliminary planning is underway on several other routes which are considered to be of early priority, among which are the East Bypass, the Riverside Parkway, the Santa Monica Parkway, and portions of the Olympic Parkway.

Standards of Design

In the design of the parkways the Interstate Standards of the American Association of State Highway Officials are being closely followed with consideration being given to the use of the Federal Interregional Highway Standards where these requirements are of higher standard. The recommended standards as to sight distance, superelevation, lengths of acceleration and deceleration lanes have been adopted.

Parkways in Los Angeles are being planned for a design speed of 60 miles per hour along the main roadways and 35 miles per hour minimum along the ramps and interchange roadways. This means that the average speed will be about 45 miles per hour along the main roadways.

Experience with the Arroyo Seco Parkway and the completed section of the Hollywood Parkway has shown that shoulders along the right hand lane of the parkway roadways are extremely important for safety and the maintenance of traffic capacity. All parkways now being planned are therefore to be provided with 8 to 10 foot sodded shoulders separated from

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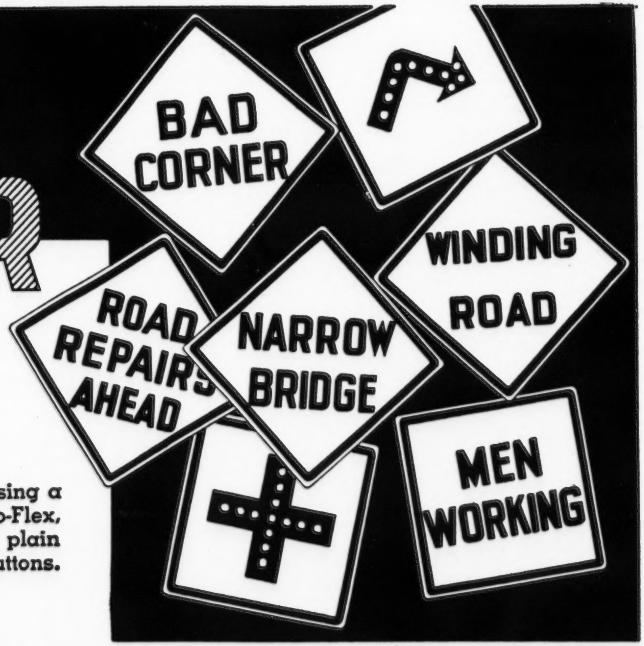

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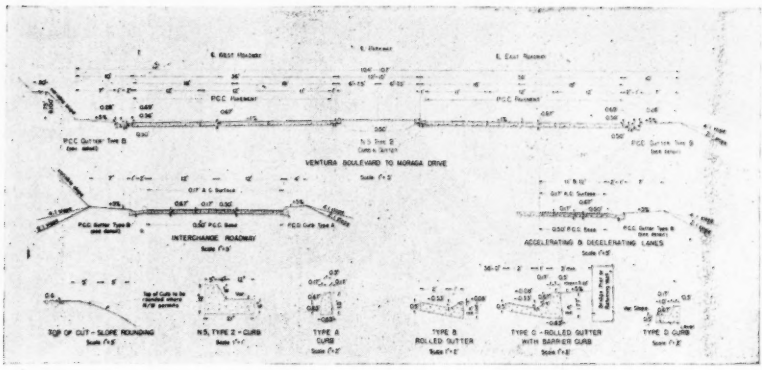
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TYPE D CURB

FIG. 2
Typical Cross Section.

the main paved roadways by a three-foot combination gutter and low rolled curb. This makes possible the ready use of the shoulders in case of emergency, but discourages their use as a possible extra traffic lane in times of heavy traffic. The gutters make it possible to keep the roadway practically free of longitudinal running water, adding greatly to the effectiveness of the roadway during rainy periods. Cut and fill slopes are normally made no steeper than 2 horizontal to 1 vertical so that these may be effectually stabilized and planted.

Cross Section Data

A typical cross section of the parkways as being designed is shown in Figure 2 and indicates the use of a center island of 12-foot minimum width. This is sufficiently wide to accommodate piers at overpasses of major streets and still permit a minimum clearance of 4 feet between the face of pier and curb. It is sufficiently wide to permit planting of sufficient height to cut off headlight glare and the sense of nearness of opposing traffic although a wider dividing strip would be desirable for this purpose. High property values in the urban area will seldom permit of the use of wider center islands.

Normally, parkway roadways will be constructed with 3 lanes 12 feet wide in each direction. However, the heavy traffic expected along certain sections of the parkways has already caused these to be designed and constructed 4 lanes wide in each direction. Local experience, as evidenced by the traffic counts formerly cited herein along the Arroyo Seco and Holllywood Parkways, both of which were counted along sections having 4-lane roadways, indicates that 4-lane roadways are not too wide for the effective carrying of traffic. Generous horizontal curvature properly superelevated is considered desirable to keep traffic in lanes. A minimum radius of 2000 feet is being maintained except where unusual circumstances force a lower radius.

It is the intention to consistently take off traffic and permit the entrance of traffic on the right side of the roadways. This will tend toward a uniformity of traffic flow and the reduction of the tendency to weave across traffic lanes. Each point of ingress and egress is found to be an indi-

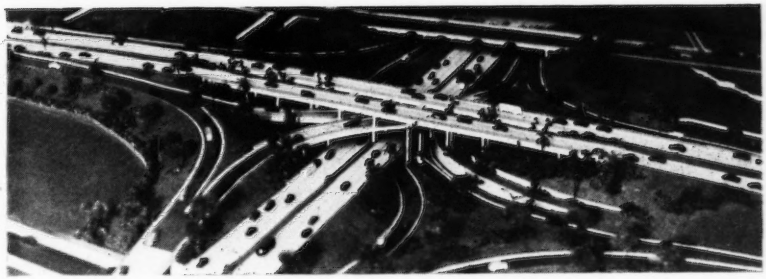


FIG. 3
Four level structure intersection of Hollywood and Arroyo Seco-Harbor Parkways. Hollywood Parkway runs from right to left.
(Photograph is of the model.)

vidual problem both as to location and design. Accelerating and decelerating lanes will be used at all points of ingress and egress.

Each interchange at the intersection of two parkways presents an individual problem. No standardized design is found to fit all conditions. (Figure 3). In general the "direct" type of interchange is preferred over the "clover leaf" type where additional travel and angle of curvature is required in turning left from one parkway to the other. A high capacity interchange at relatively high speeds is required to properly serve the high capacity parkways.

Because of the heavy traffic which will use the parkways during all hours of the day and night every safety precaution in the way of warning signs, reflectors, flashers and special lighting at points of potential hazards will be provided. In addition it is considered essential to provide lighting of adequate intensity along the full length of the parkways to assure the maximum of safety and comfort of night driving.

Finally, parkways are so named because they will be developed on broad rights of way, usually a minimum width of 200 feet, with wide marginal areas broadening the main roadways. These areas will be planted with grass and landscaped with informal groupings of native shrubs and trees. In the development of the parkways it has been a primary consideration that these arteries should be more than just traffic carriers. It is believed that the location of the parkways will have a marked effect on the future development and zoning of the areas through which they pass. An attractive construction of a valuable traffic and transit facility will tend more than any other single factor to fix and stabilize values in the districts and the city as a whole.

As has been previously indicated, construction of the parkways at a rate commensurate with the need is dependent on provision of additional highway funds. This matter is now before a special session of the California State Legislature as the construction of adequate urban highways in the metropolitan areas of the State is considered to be a matter of statewide importance. While opposition to this program has arisen from certain interests, the weight of evidence of the need presented has been so great that it is considered probable that a constructive program of financing will be adopted.

NEW DEVELOPMENTS IN TRAFFIC ENGINEERING

by CHARLES S. LECRAW, JR., *Assoc. Editor*

MIAMI IMPROVES TRAFFIC FLOW

Traffic conditions have been improved in the central business district of Miami, Florida, as a result of a 3 months Parking and Transportation survey conducted by the Department of Traffic and Transportation. According to a report in the June, 1947, issue of Civil Engineering, traffic movement in the central district of Miami has substantially improved in spite of a 16 per cent increase in volume at the peak of the 1947 winter season. The improvements are based on four groups of changes: (1) Revision of bus routing and distribution of terminals, (2) Revision of the use of curb space, (3) changes in one-way streets, (4) complete laning of practically all downtown streets.

Buses were rerouted in order to minimize the number of left turns made in the central district. The use of curb space was determined on a priority basis, with moving traffic receiving first consideration. Parking time limits were changed, and although the total number of car spaces was reduced from 2,080 to 1,835, the number of cars which could be accommodated was increased 38 per cent through strict observance of the new regulations.

TERMINALS FOR FREIGHT

Two major terminals—one a railroad center and the other a produce center—involving the expenditure of more than $6,000,000, will be built at Houston, Texas, and New Orleans, Louisiana.

Biggest of the two will be a $4,000,000 wholesale produce terminal sponsored by the Houston Fresh Fruit and Vegetable Association, to provide housing for all produce groups of the area and to handle all perishable cargo shipments into the city.

At New Orleans, representatives of the city's Association of Commerce, railroads and business houses announced plans for a $2,000,000 rail-freight terminal in the downtown area. The terminal would consist of four buildings, each providing office and storage space, with tracks between them for easy handling of material.—(Engineering News-Record, July 3, 1947).

HANDBOOK OF ACCIDENT PREVENTION

The Liberty Mutual Insurance Company has recently issued a handbook designed to assist communities in prescribing treatments for their traffic ills. The handbook contains 131 pages and is divided into three parts: Part I describes a procedure for determining through analysis the accident problem susceptible to engineering correction. Part II deals with traffic engineering controls which might be applied to the locations where accidents occur. Part III describes the methods for gathering the necessary factual data on traffic flow to assist in the selection of the proper remedies at the problem locations.

The book was written by William E. Billings, director, Traffic Safety Bureau, Liberty Mutual Insurance Co., and Dwight M. McCracken, manager, Motor Transport Bureau, Liberty Mutual Insurance Co. Both authors are members of the Institute of Traffic Engineers.

STREET PROBLEMS

Urgently needed repaving and rehabilitation of city streets, and provision of off-street parking facilities in congested business areas continued to occupy the attention of city engineers' offices and planning groups, according to the Engineering News Record.

The Massachusetts Supreme Court was asked to rule on the issue of building a 3,500-car garage under Boston Common, after preliminary hearings in lower courts. The state courts must decide the question since previous court decisions appear to make disposal of the Common a matter for state, rather than city, decision. Boston engineers, meanwhile, released a report estimating cost of the proposed underground structure at $5,000,000.

The Planning Board of Charlotte, N. C., considered plans for erection of a raised parking lot, about a block square, over one of the downtown railroad freight yards, and commissioned the Charlotte engineering firm of J. N. Pease Co. to prepare preliminary plans and furnish cost estimates.

Dayton, Ohio, city commissioners settled a dispute over routing of an interregional superhighway by approving a route that would cut through the city, after hearing arguments, from opponents who contend that such a highway should by-pass the city. At Fort Wayne, Indiana, the Board of Public Works approved plans for rehabilitating three principal thoroughfares through widening and repaving.

For going through the entire year of 1946 without a single traffic fatality, 153 cities with populations between 5,000 and 10,000 have won places on the National Safety Council's honor roll.

YALE ISSUES FIRST TECHNICAL REPORT

Members of the Institute and many other engineers in the traffic field recently received copies of "Traffic Performance at Urban Intersections", Technical Report No. 1 of the Yale Bureau of Highway Traffic.

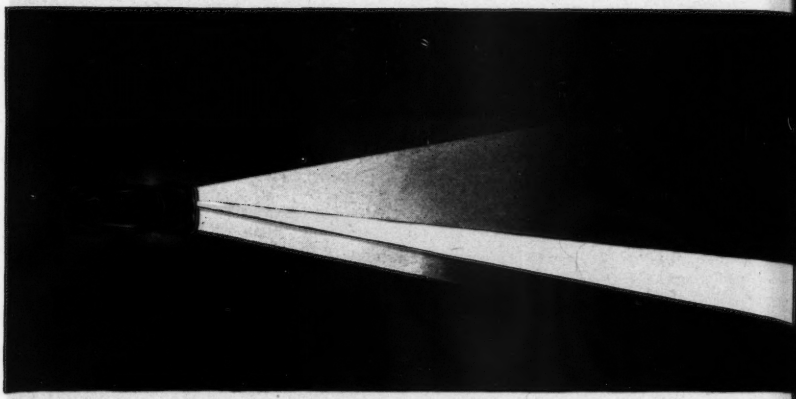
This report is the result of staff research into the time-space relationship between traffic units operating in the traffic stream and is co-authored by Bruce D. Greenshields, Donald Shapiro, and Elroy L. Ericksen. It is the first of a series of technical reports of worthy staff and student investigations which will be issued by the Yale Bureau.

"This report was prepared primarily for traffic engineers", Bureau Director Ted Matson said, "and although it is of an exploratory nature, it discusses many significant aspects of intersection traffic performance. The first portions of the report deal with the more commonly observed values of acceleration and deceleration, and a time-spacing analysis of traffic behavior at non-signalized intersections."

The most significant part of the work is the use of mathematical principles to check observed vehicular traffic patterns and the application of these principles to such typical traffic problems as signal timing and delays, stop sign delay, accident exposure due to obscured vision and others. Although much work remains to be done in developing traffic performance constants and their use in the application of mathematical principles to solving traffic problems, the Bureau is encouraged by the results obtained so far.

Those who have not received the report are invited to write the Bureau for a copy. Requests should be directed to Mr. Theodore M. Matson, Director, Yale Bureau of Highway Traffic, 311 Strathcona Hall, New Haven, Conn.

Announcing A BRIGHT



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TO HOLD CONFERENCE ON URBAN PROBLEMS

The United States Chamber of Commerce is sponsoring a "Businessmen's Conference on Urban Problems" in Washington on September 11 and 12. Members of the Institute of Traffic Engineers scheduled to participate in this meeting include: Paul G. Hoffman, Thomas H. MacDonald, G. Donald Kennedy, Grant Mickle, Harold F. Hammond and Robert A. Mitchell.

The subjects to be discussed at this meeting together with a list of questions covering each subject are listed below.

RELATIONS OF CITY PLANNING TO COMMUNITY DEVELOPMENT.

Questions: 1. What should be the organization and function of an effective city planning commission? What should be the relation to the operating agencies of the city? 2. City planning methods, among them zoning, have been ineffective in many cities in assuring stable, orderly urban growth. What can be done to correct this? 3. What is the so-called "Master Plan?" How should it be developed and what can it accomplish? 4. What can be done to secure effective citizen support in developing and maintaining a city planning program? 5. What should be the relation of city planning to the business activities and economic base of the community, and where has it failed in translating city plans into action? 6. What is meant by urban decentralization? How is it affecting our cities, and how can it be controlled? 7. Is annexation an answer to the problem of expanding urban areas?

TRAFFIC CONGESTION:

Questions: 1. What can we do immediately to ease traffic congestion? 2. How can improved control of curb parking help? 3. What about providing adequate pedestrian capacity on business district sidewalks? 4. How can better transit service improve conditions? 5. How can traffic generated by various downtown establishments be measured? 6. How can an orderly program of street improvements be organized? 7. What permanent relief can be obtained from expressways and other facilities of modern design? 8. What are the proper relations between the street improvement program and city planning? 9. What are the proper relations of the state highway departments to city officials?

OFF-STREET PARKING

Questions: 1. What are the more important facts revealed by an off-street parking study? 2. What can be done to get parking facilities located where needed? 3. What are the principal parking lot operating problems? 4. What can be accomplished by regulating parking lots and garages? 5. What changes in zoning policies and building restrictions are needed to help solve parking problems? 6. Is legislation needed to facilitate the creation of new parking facilities? 7. How should new parking lots and garages be financed? 8. Can shuttle bus service be effectively used with fringe parking lots? 9. How does the commercial vehicle loading problem fit into the parking situation? 10. What is the relationship of off-street parking to urban expressways?

REBUILDING BLIGHTED AREAS

Questions: 1. Is it desirable and practical to assemble land in run-down or inadequately developed areas for large-scale rebuilding in accordance with the city plan? 2. How should such projects be related to express highways? 3. Who should assemble the land? 4. Who would finance its assembly? 5. Who should redevelop it

after assembly and replatting? 6. Who should be responsible for rehousing displaced families? 7. Are subsidies necessary to ensure redevelopment? 8. Who should pay such subsidies?

NATIONAL INSTITUTE MEETS IN ATLANTA

The Ninth Annual Institute for Traffic Training, sponsored jointly by the Institute of Traffic Engineers and other organizations, was held June 16-27, 1947, on the campus of the Georgia School of Technology in Atlanta, Georgia.

The course in traffic engineering, directed by Wilbur S. Smith, Secretary-Treasurer of the Institute, was attended by 39 city, county and state traffic officials. The majority of the students were from the southern states although some came from as far away as Oregon, Colorado and Toronto, Canada. Assisting Mr. Smith in the instruction were: Robert S. Holmes, Executive Secretary of the Institute; Elroy Ericksen (Assoc. ITE), Yale University Bureau of Highway Traffic; and Charles LeCraw (Jun. ITE) from the Eno Foundation.

The following members of the Institute appeared as guest lecturers and members of panels held on various subjects: Lawrence S. Tuttle, Assistant to the Commissioner, Public Roads Administration; George T. Papageorge, Vice President, Harris Engineering Corporation, Atlanta, Georgia; Karl Bevins, Traffic Engineer, Georgia Power Company; Paul Ristroph, Traffic Engineer, New Orleans Public Service Co.; Robert A. Burch, Traffic Engineer, North Carolina State Highway and Public Works Commission; Thomas Walbert, Traffic Engineer, Georgia Highway Department; Harry Howard, Traffic Manager, Florida State Roads Department; David M. Baldwin, Traffic Engineer, National Safety Council; and Burton Marsh, Director, Traffic Engineering and Safety, American Automobile Association.

Donald S. Berry (Assoc. ITE) served as chairman of the administrative Committee. Other courses directed by members of ITE included: pedestrian protection, directed by Burton Marsh; accident records and their uses, directed by David M. Baldwin; and seminar on control of negligent drivers through licensing procedures, directed by T. Elmer Transeau.

The graduation dinner held at the close of the session featured F. M. Kreml, director, Northwestern Traffic Institute, (Affil. ITE) as the principal speaker, with Norman Damon (Affil. ITE), vice president of the Automotive Safety Foundation, presiding.

FOURTH CONNECTICUT CONFERENCE HELD

The Fourth Connecticut Traffic Engineering Conference, jointly sponsored by the Yale Bureau of Highway Traffic, the Connecticut Highway Safety Commission and the Connecticut Association of Street and Highway Officials was held in New Haven in June. It was attended by more than 90 city and town officials from most of the major Connecticut communities. It was a one-day session with formal speeches in the morning and panel discussions in the afternoon, all dealing with the traffic problems of Connecticut. In the evening after dinner, the time was devoted to discussing the work being done by New York State's Urban Arterial Route Planning Bureau.

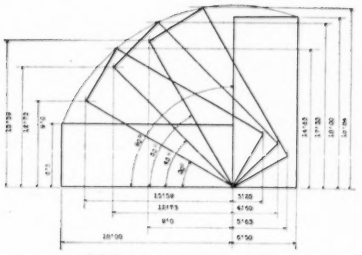
This year the Conference was characterized by the emphasis placed on the problems that the members were having in their respective communities. The formal papers were very short, leaving ample time for general discussion. It was generally agreed

that the enthusiasm and seriousness of the member participation was an exceedingly healthy sign for the furtherance of traffic engineering consideration in the cities and towns represented.

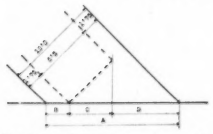
In the State of Connecticut there is no city or town at the present time that employs a full-time traffic engineer with sufficient authority and funds to accomplish anything constructive. The traffic problem has grown up as the responsibility of many individuals and commissions with most of the daily operations being the responsibility of police departments. This lack of an integral policy in the regulation, design, and planning by a unified administrative agency is felt to be among the reasons for the slow development of traffic improvements. It is unfortunate that in most cities and towns where the traffic problem is greatest, sound traffic engineering procedures are not being followed. However, in the State Highway Department many traffic engineers are contributing much to the orderly movement of traffic on the State highway system.

The following members of the I.T.E. took part in the conference: Theodore M. Matson, Wilbur S. Smith, Fred Hurd, Elroy L. Ericksen, Edmund R. Ricker, L. Theodore Scott-Smith, Charles S. LeCraw, Jr., Francis E. Twiss, Robert S. Holmes.

REFERENCE NOTES



Curb Space for Ten Foot Parking Stalls



Parking Angle	*A*	*B*	*C*	*D*
30°	20'00	5'50	5'25	13'25
45°	14'14	7'47	6'60	7'07
60°	11'55	7'02	5'63	5'90
90°	10'00	1'75	6'50	1'75

Curb and street space occupied for various parking patterns. Vehicles 6.5 feet by 18.0 feet.

(Eno Foundation for Highway Traffic Control)

NEW GRASS ROOTS FOR PARKS

The vision of a park upstairs was being studied as a substitute for a garage downstairs by planners trying to solve New York City's parking problem, according to the New York World-Telegram.

Mayor William O'Dwyer's special traffic committee recommended a program which would call for the expenditure of $7,220,000 for underground garages at Bryant Park and Madison Square Park.

The plan was promptly branded as costly and impracticable by Park Commissioner Robert Moses, who pointed out that a maze of water and sewer lines runs under each park and that the Queens IRT subway nicks a portion of Bryant Park.

City planners did a quick retake and this it was said at City Hall is the vision they are toying with:

The parks would be used for parking. Above them would be built a structure with a second floor used for parking, and the third, or top story, for the grass, walks, benches and trees. Instead of strolling into the park, you'd go up to it by escalator.

It's cheaper, the planners say. More practical, too.

PRESIDENT'S ENGINEERING GROUP MAKES EIGHT RECOMMENDATIONS

Eight recommendations were made by the Engineering Advisory Group to the President's Highway Safety Conference held in Washington, D. C., in June. The recommendations as reported by the Group's chairman, Gibb Gilchrist, are listed below.

I.—Coordinated Safety Activity

County roads and city streets were developed independently until the decade of the thirties. Coordination in the planning and construction of highways and streets is the new trend, with safe transportation a main objective.

Some State highway departments are far advanced in their contracts with cities and with State and local planning and housing officials, police, educators, and civic groups in the coordination of traffic safety work. Some departments conduct surveys and furnish advice upon request from the cities. In others, the highway departments are restricted by law from aiding urban centers except in relation to State routes.

In New York State, the new Bureau of Arterial Route Planning is working with 40 cities in the selection of express routes that will serve the communities and the State to best advantage.

In many cities throughout the country, travel-habit studies sponsored by the State highway departments and the Public Roads Administration have served as stepping stones to cooperative work with local officials. Aimed at safer use of existing improvements as well as development of new facilities, these studies enable the States to give cities effective aid in planning modern urban highway, street, and parking facilities.

Lesser examples of State-city cooperation include investigations directed at problems in parking, intersection design and control, routing, signing, speed zoning, and one-way streets. The trend toward greater integration of the rural and urban phase of traffic safety has been given impetus by the Federal-aid Highway Act of 1944. In this legislation, Federal funds for construction of city expressways are made available for the first time. They are apportioned to the State for expenditure through the State highway departments. These departments are under obligation to administer the Federal aid for cities to obtain maximum relief of the urban traffic problem. Wise administration requires adequate and mutually satisfactory working arrangements with the cities.

A. Glen Smoot, (Assoc. Mem., ITE) Traffic Engineer, Arizona Highway Dept., who was one of the speakers at the 1947 President's Safety Conference.

The joint achievements of State highway departments and other State and local groups in engineering for traffic safety are encouraging—yet they represent only a good beginning. State highway departments in general need to go much further in coordinating their highway safety work with that of State and local groups.

The Engineering Advisory Group recommends additional attention to the coordination of the highway safety

work of State and local planning and housing officials, police, educators, and civic groups. It recommends particularly that working contacts be maintained with one or more selected groups to determine by actual trial the value of this cooperative activity.

II.—Summarization of Surveys

Highway planning surveys have been under way since 1935. All States now require the continuous collection of comprehensive and complete information concerning the character, extent, condition, and accident record of their road systems.

The next essential step is for all States to summarize the findings of their highway planning surveys. California has completed and Michigan has begun extensive and significant projects for the presentation of engineering data developed from the highway planning surveys. An account of the accident experience in these States is a part of their summaries.

The Engineering Advisory Group recommends that similar summarizations be completed in each State. It further recommends that each State draw up an appropriate long-range plan for future road improvement based on the summary of survey findings. A well planned and executed road program will remedy many of the defects in the existing highway system, principally through the use of up-to-date design standards.

III.—Research

Research is basic to progress in designing and building safer highways. State highway departments are recognizing this principle and their responsibility in applying it. They are seeing the value of research activity to their own personnel and of the specialized experience of their personnel to the general research program.

Under the Federal-aid Highway Act of 1944 money is available for participation by the States in research and economic investigations of general value in highway safety activities. Fifteen States have joined in a cooperative study of the relation between highway design and frequency of traffic accidents on rural sections of principal routes. Known as the National Interstate Highway Accident Study, this research was sponsored by the Public Roads Administration and the National Safety Council. Some other work of this character also has been done.

State highway departments have supported the Highway Research Correlation Service established last year by the Highway Research Board of the National Research Council. To stimulate further highway department activity in traffic research, a specialist in traffic was added to the Service staff early this year.

A considerable number of highway departments have set excellent examples in the field of research. In view of the extreme need for many additional investigations in the traffic and safety field, the Engineering Advisory Group recommends that every department undertake some phase of the national traffic research program. The Highway Research Correlation Service is serving as the clearing house for these activities and the 1½-per cent fund authorized by the Federal aid Highway Act of 1944 for research and economic investigation is available for participation in projects of this nature.

IV.—Allocation of Grade Crossing Costs

The 1946 report of the Committee on Engineering outlined the steps that are essential to the protection of highway-railway grade crossings. The complete protection is, of course, separation of grades.

The 1947 summary of progress in engineering indicates that the substantial prewar activity in the elimination

of rail-highway grade crossings has now been resumed. In those cases where the separation of grades is not feasible, the report cites excellent progress in protecting crossings by the installation of standard protective devices.

The 1947 report also reemphasizes that present State and local laws are not entirely equitable in respect to the appropriate division of the cost of crossing protection between railroad and highway.

The Federal-aid Highway Act of 1944 established a formula for the equitable distribution between railway and highway interests of the cost of grade separation, reconstruction, and protection projects, based on relative benefits to road and rail transportation. Several States are following this example.

It is believed that an equitable allocation of the costs of crossing protection will accelerate the work of the States in protecting or eliminating grade crossings. The Engineering Advisory Group therefore recommends that those States which have not yet done so should consider the revision of their grade-crossing laws along the lines of the Federal-aid Highway Act of 1944.

V.—On-the-Job Training

With the expansion of their forces since the end of the war, several of the State highway departments have been active in personnel training, particularly in training of returned servicemen. Some have sent staff members to traffic institutes. Others, such as Michigan, and Utah, have emphasized on-the-job training. In these States, key department officials have led weekly or monthly seminars to acquaint employees with the activities of the department.

On-the-job training has produced particularly gratifying results. On the premise that improved quality in all branches of highway engineering eventually leads to safer highway design, construction, and operation, the Engineering Advisory Group recommends that all States which are not already providing in-service training should consider the advisability of establishing some form of training course.

Paint drippings from spray guns have been collected in large quantities, reworked and used to strip Ohio state highway centerlines. Harry Neal (Mem., ITE), Ohio's traffic engineer, who devised this method of obtaining lane markings, is testing the life of this reclaimed material. He hopes to have some test results for publication in a future edition of *Traffic Engineering*.

VI.—Upward Revision of Design Standards

In the advance planning of postwar highways, experience with the earlier highway design standards and new findings in traffic research were carefully reviewed. The results of the early part of this study appeared in the report of the Interregional Highway Committee.

The recommendations of the Interregional Committee in turn had a noticeable effect on the standards subsequently approved by the American Association of State Highway Officials for routes of the National Interstate System. These upward revisions in design standards have been widely adopted.

Other significant design changes have been applied by individual States. Added lanes for trucks on grades and wider shoulders over crests with restricted sight distances are now established policy in Colorado. New

Jersey is emphasizing adequate signing in all features of layout and design. Many States are paying more attention to intersection design and to channelization. In process of development are provisions for added lanes and loading facilities for mass transit vehicles on urban expressways.

Marked progress in the design of modern high-speed highways is evident. The Engineering Advisory Group recommends that each State highway department take full advantage of the services of the Highway Research Correlation Service, the Public Roads Administration, and their own interstate contacts to accumulate additional refinements in the standards of design of safe roadway facilities.

VII.—Controlled Access

Control of access is one of the most important safety elements for highways handling heavy volumes of traffic. Yet it is so new a concept in this country that it is still being tested in the courts as to its constitutionality. Frequently the only way for State highway departments to use this type of improvement is to obtain legislation specifically authorizing it.

The policy of the highway department in California is to acquire access rights on practically all new construction. In several States, access control has been approved for one or more cities but not for State-wide application.

In States lacking access-control legislation, highway departments have adopted a policy of purchasing additional right-of-way width as substitute protection for the highway department.

It is probable that this type of facility will ultimately be accepted universally. In view of its high value as a highway-safety measure, the Engineering Advisory Group recommends that the long-term policy of all State highway departments should be directed toward eventual acceptance of the access-control type of highway construction.

VIII.—Accident Records

Certain locations often have more than their share of the accidents on the highways. If a State is to make substantial progress in its safety effort, it must be able to identify these high-accident locations promptly. This calls for an adequate accident-reporting system. Progress in highway safety also demands a successful plan for study and treatment of dangerous locations.

In Utah and Virginia, three accidents at one location put into operation a system involving a complete report, a detailed study, and a prescription for treatment if road conditions seem to be responsible for the accidents. Minnesota and a few other States follow a similar system.

Texas, Massachusetts, and California use accident-record information in their broad program of planning and programing construction and maintenance. Many States apply their accident experience in determining the effectiveness of traffic control devices and regulations as well as the design of the highway itself.

33 ARE GRADUATED

Thirty-three law enforcement officers from city, county and state police agencies in all sections of the country, from a state motor vehicle department, the Army and from the Chinese Ministry of Interior were graduated from the Northwestern University Traffic Institute upon completion of the 1947 spring course in traffic administration.

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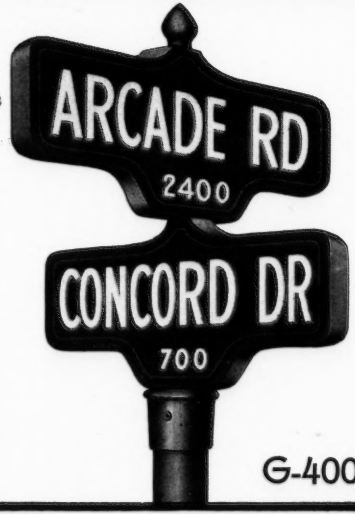

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Activities . . . .

SECRETARY'S COLUMN

A recent letter from "Nick" Carter (Member) via Ted Matson evidenced considerable pride in young daughter Paulena's musical accomplishments. She now appears as concert pianist on a weekly radio program (CBS, Wed., 6:30 P.M.) produced by Meredith Wilson and sponsored by Ford Motor Co. Nick has high hopes of a series of audition and guest soloist performances with leading Symphony orchestras throughout the country. He talks further of appearances as guest soloist on the "Standard Hour" (West Coast), a play written around Paulena and a Twentieth-Century Fox movie. Nick says a career of classical concerts, like any other stage, screen or radio career, thrives on "fan mail", so you interested members can give Nick an assist by spreading the word around.

A number of ITE members participated in the National Traffic Training Institute held at the Georgia School of Technology in Atlanta recently. Since 19 members were present, an informal luncheon get-together was arranged and there was considerable talk of formation of a Southeastern Section of the Institute.

The new traffic engineer for the city of Kalamazoo, Michigan, is James R. Wichman, recent graduate of the Yale Bureau of Highway Traffic and a member of the first official Student Chapter, ITE. Wichman, a graduate Civil Engineer from the University of Cincinnati, was formerly connected with the City Engineering Department of Cincinnati. Other recent graduates of the Yale Bureau who have accepted new positions are Roger T. Chandler, Asst. to Phil Mancini, Providence, R. I.; David Dabney, Asst. City Traffic Engineer, New Orleans; Jerome D. Franklin, new assistant to Arnold H. Vey, New Jersey Dept. of Motor Vehicles; H. Dean Fravel, P.R.A., San Francisco, Calif.; Herbert J. Klar, Long Island Parkway Commission; and Robert E. Schmidt, Washington State Dept. of Highways as Asst. to D. E. Morris, Traffic Engr.

Several large cities throughout the country that have never established a City Traffic Engineering Department are making inquiries for necessary legislation. Watch for official announcements at a later date.

MEMBERSHIP CHANGES, ADDITIONS ANNOUNCED

The Board of Direction has announced the following additions and changes in the membership:

New Members

Thomas Sutton Watts, Jr.
Traffic Engineer
Room 322, City Hall
St. Louis 3, Missouri

James R. Palmer
Assistant District Traffic Engineer
Division of Highways
Dixon, Illinois

Edmund Friedman
Consulting Engineer
200 Langford Building
Miami, Florida

James S. Saylor
Senior Engineer
Department of Traffic Control
410 City Hall
Dallas, Texas

New Associates

Walter D. Gottschalk
Supt. of Traffic Planning
Dept. of Traffic and Transportation
300 City Hall
Miami, Florida

Ervin R. Leiser
Assistant Traffic Control Eng.
Bureau of Electrical Service
Room 713, City Hall
Milwaukee 2, Wisconsin

Kermit B. Rykken
Acting Mgr. Minnesota Highway Planning Survey
Minnesota Dept. of Highways
St. Paul, Minnesota

George B. Houston
Chief, Fire Prevention Sub-Section
Headquarters Fourth Army
Engineer Section
Fort Sam Houston, Texas

Walter A. Spratt
Traffic Consultant
Welsbach Street Lighting Company of America
1500 Walnut Street
Philadelphia, Pennsylvania

Glenwood F. Baker
Highway Traffic Engineer
Michigan State Highway Department
Lansing, Michigan

Ellis Leroy Mathes
Traffic Engineer
Idaho Bureau of Highways
Boise, Idaho

Gilbert W. Treble
Traffic Engineer
State Office Building
65 Court Street
Buffalo, New York

George F. Helliwell
Associate Traffic Engineer
Street Traffic Engineering Bureau
Los Angeles, California

Harry R. Burton
Assistant City Traffic Engineer
Department of City Planning
Toronto, Ontario

Russell G. Bates
State Manager Highway Planning Survey
Department of Highways
Olympia, Washington

Arthur M. White
Assistant Engineer of Maintenance
Mississippi State Highway Dept.
Jackson, Mississippi

Francis E. Twiss
Research Associate
Bureau of Highway Traffic
Strathcona Hall
New Haven 11, Conn.

Stanley Woolman
Highway Engineer
Public Roads Administration
112 State Street
Albany 1, New York

New Juniors

Ray C. McCally
Supervisor, Field Traffic Studies
Arizona Highway Department
Phoenix, Arizona

Frederick I. Eggan
Highway Traffic Engineer
State Highway Department
Lansing, Michigan

The following members were transferred:

Associate to Member

William H. Mann
Martin E. Bruening
George J. Fisher

Junior to Associate

Edward I. Shulman
Joseph E. Havenner
Z. A. Faulkner
Bernard L. Johnson

YEARBOOK CHANGES

Mr. Eugene A. Barton
711 South Central Avenue
Baltimore 3, Maryland

L. W. McIntyre
7118 Card Lane
Pittsburgh, Pa.
Att: Miss Eliz. McIntyre

I T E PERSONALS

J. Edward Johnston (M e m.) has been appointed executive secretary of the Nebraska Safety Council. Mr. Johnston was formerly traffic engineer for the state of Nebraska.

Earl Reeder (Mem.) is anxious to establish a Florida section of the ITE in Miami. There are six members of the Institute now living in Miami.

James E. P. Darrell (Mem.) is aiding in the promotion of a three-day traffic conference to be sponsored by the Minnesota Dept. of Highways, the University of Minnesota and the Minnesota League of Municipalities. The Institute of Traffic Engineers, through its executive secretary, will help to coordinate the conference.

Tom Willier's (M e m.) official title with the city of Houston is Director of the Department of Traffic and Transportation. This is a new organization in the city government.

Robert F. Royster (Jun.) is now with the Port of New York Authority.

Russell E. Harrison (Assoc.) h a s been named editor of the Michigan Engineer, a publication of the Michigan Engineering Society. **T. T. Wiley** (Mem.) is executive secretary of the society.

Henry K. Evans (A s s o c. Mem.) and **J. A. Carrothers** (Assoc. Mem.) of the National Conservation Bureau, 60 John Street, New York, presented their Westport, Connecticut, traffic survey report to the Westport Board of Selectmen.

An Official Traffic Committee, which the report recommended, has already been appointed to carry out the suggested improvements including a parking improvement program designed to attract shoppers to the community.

The recommendations included additional off-street lots, changes in signal timing, a channelizing island, a pedestrian barrier, and a pedestrian-actuated signal.

Ted Matson (Mem.), Yale's Traffic Bureau director, is spending the summer editing his lectures, preparatory to publication of a text book.

Phillip E. Taylor (Assoc. Mem.) is on active duty with the army in Washington, D. C.

F AND F OUTING

The annual meeting of the F and F Club was held at Balsam Lake, Wis., on June 20, 21 and 22. Although the bass season was open, no fish bit for the traffic engineers.

Those attending the three-day excursion were Harry Porter, Bill Abbott and family, Wayne Volk, Howard Ilgner, Ralph Gross, Bill McConochie and Matt Sielski.

SECTION NEWS

MICHIGAN SECTION

The Michigan section held their annual June outing at Warren Valley Golf course, Garden City. Golf and baseball were played in the afternoon and were followed by a dinner and card games. Ollie Carrier and Russ Harrison were co-chairmen of the program committee and were assisted by Art Gibson, Johnny Dobelek, Joe Gable, Al Hanson and Wally Pletcher.

—o—

MID-WEST SECTION

The Mid-West section has voted to sponsor a luncheon for Institute mem-

bers attending the annual Safety Congress in Chicago in October.

WASHINGTON SECTION

In addition to 35 regular Washington members in attendance at its June 18 meeting, the section was pleased to see the following out-of-town visitors: T. F. Creedon, Detroit; Edgar F. Copell, Boston; Donald M. McNeil, Pittsburgh; Leslie Williams, New York; Edward G. Wetzel, New York; Fred P. Gunning, New York; Arnold Vey, New Jersey; J. E. P. Darrell, Minnesota; Wilbur Smith, New Haven, Conn.; Earl Reeder, Miami, Florida. A number of visitors were delegates to the President's Highway Safety Conference.

Following the secretary's report and a welcoming of visitors by President Mitton, Wm. H. Voltz reported on progress of the proposed Engineer's Club for Washington.

Harold Hammond's kind invitation to hold a summer outing and picnic at his home was accepted unanimously.

President Mitton introduced the speaker of the evening, Mr. Joseph Barnett, Chief, Urban Road Division, Department of Design, U. S. Public Roads Administration, who gave an interesting and thoughtful presentation on the subject of "Toll Roads". A lively discussion period followed, including a suggestion by Burton W. Marsh that Mr. Barnett's remarks be made available to readers of TRAFFIC ENGINEERING.

Detroit traffic engineers are experimenting with traffic control on Grand River Avenue. New signal control, trial of reversible lanes for rush hour traffic and substitution of bus for street-car operation are producing highly satisfactory results.

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Personalities . . . .

Like baseball's Connie Mack, Edward H. Holmes is better known by his nickname, "Ted Holmes." Unlike Connie Mack, however, Ted roots for the Boston Braves, who with his help and the financial support of a highway contractor, are potential World Series material.

In the interludes between his week-end efforts to perfect his golf game (85 being regarded as practically perfection), Mr. Holmes practices his brand of traffic engineering in the Public Roads Administration.

Graduating from M.I.T. in 1928, an institution of learning near his native Cape Cod, he went to work for Public Roads and since then has had no other employer, a record somewhat unique in the traffic engineering field.

After a year in the field he took advantage of one of the early Erskine fellowships, and through the year's effort at Harvard produced, in collaboration with L. S. Tuttle, a treatise on the economics of highway intersections. This document won professional recognition for the authors and provided an entree to the newly formed Division of Highway Transport in Public Roads. Here Ted has remained, progressing through the ranks of the Division until he now is its chief.

Under his immediate direction or

(SEE HOLMES ON PAGE 501)

Ted Matson, a charter member of the Institute of Traffic Engineers, started life in Denver, Colorado, on Saint Patrick's Day, 1903. He didn't stay in town very long, however, for his folks moved him up to the Oregon Trail where it crosses the Nebraska-Wyoming line. There he grew up in the sagebrush and cactus, getting his elementary education from the country school house, and got into his first traffic problems by trying to push his saddle horse through the snow drifts into high school in town (Mitchell). It seems he finished his high school at the tender age of sixteen, and following the advice of Horace Greeley he went West over the ridge to Palo Alto, California, where he enrolled as a major in Chemical Engineering at Stanford University in the fall of '19. Four years later they gave him a degree as a Chemical Engineer, but by that time he was so comfortably situated slinging hash at the Alpha Phi house, and became so fascinated with the engineering aspects of his work, that he held over a couple of extra years and majored in Mechanical and Electrical Engineering. At that time the profs threw him out before the school closed in the spring quarter of 1925, with the promise that he would receive a degree in Electrical Engi-

(SEE MATSON ON PAGE 502)

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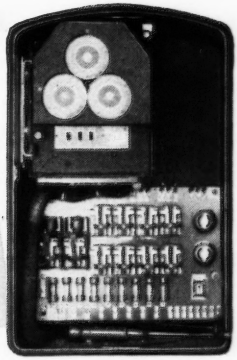

Where the ratio of cross-traffic to through-traffic varies during the day, use of General Electric multi-dial controllers should be carefully considered. These controllers are being accepted by city after city as *the* solution for this complicated traffic problem.

For example, San Francisco, where similar types of G-E controls are installed on 19th Avenue, is installing 55 G-E 3-dial controllers on Van Ness Avenue and on other streets. The new installation includes, in addition to the intersection controllers, four master controllers with program devices and reset interrupters, and modern G-E signals throughout.

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While General Electric three-dial controllers represent the most versatile of all standard traffic-control equipment, San Francisco finds them dependable and requiring little more maintenance than the simplest controller. They have been engineered for economy. Mechanically they are simple and sturdy. They are easily serviced, and their settings are such that accidental disturbance is almost impossible.

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GENERAL ELECTRIC

453-38D

ASF TO ASSIST WITH ENGINEERING STUDIES

Invitations from joint fact-finding legislative committees of Oregon and Washington to provide engineering consultants on state-wide highway development studies have been accepted by the Automotive Safety Foundation. The work will be similar to that in California last year.

G. Donald Kennedy, (Mem., ITE) vice-president in charge of the ASF highway division, will have charge of the studies and prepare a report of findings in each state. Active direction of the work in both states has been assigned to Carl Fritts, (Mem., ITE) ASF highway engineer. D. Grant Mickle, (Mem., ITE) traffic engineer; Joe Mattson, west coast representative, and other ASF staff specialists are expected to participate.

The Foundation already is serving in an advisory capacity on a similar state-wide study now under way in Michigan. Governor Kim Sigler has vetoed a bill which would have raised Michigan's gasoline tax one cent, allocating the additional revenue to counties and cities. The governor said that the state-wide survey of highway needs should be completed before such action for new highway revenue is taken.

When the Washington and Oregon work is completed, ASF engineers will have conducted fact-finding highway studies for the entire west coast region.

Bloomington, Ind., reported a profit of more than $12,000 from parking meters in service for a year.

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PANEL DISCUSSION AT ANNUAL MEETING

"Practical Ways of Bringing Traffic Engineering Service to Cities under 75,000 population" is the subject of a panel discussion scheduled for the Eighteenth Annual Institute Meeting in Detroit, October 1 through 4, 1947.

Harold F. Hammond, Assistant Manager, Transportation and Communication Dept., U. S. Chamber of Commerce, is to be the discussion leader. Panel members include: J. E. P. Darrell, Ass't. Traffic Engineer, Minn. Dept. of Highways; Harold G. Eckhardt, Asst. Chief Traffic Engineer, Ohio Dept. of Highways; George Papageorge and C. Richard Gallagher, consultants.

(HOLMES, Cont. from Page 498)

general guidance have been developed many of the basic elements of traffic flow that are now generally accepted in highway design and traffic operation. Present-day traffic counters of fixed and portable type stem directly from pilot models developed in Highway Transport, as do other types of traffic-recording equipment. Standards of lane capacity, vehicle performance, passing distances, and highway alinement are among the results of its researches. Mr. Holmes' work is not confined to traffic operation, however. He also has responsibility for the traffic phases of the highway planning surveys, providing that highway planning and traffic engineering can be compatible. From the planning work have come many modern traffic survey techniques, including the "home interview" surveys conducted in some 60 urban areas, and the sampling schedules now in use in the State-wide planning surveys. Under his wing also is the staff work connected with the development of the Manual on Uniform Traffic Control Devices and other similar committee activities.

He has served and is serving on a variety of committees in the traffic engineering field. He has the perverted (for a highway engineer) hobby of photographing railroad locomotives. The father of two boys, Mr. Holmes harbors a hope that his own offspring will not be required to help the Braves win the National League pennant.

POSITIONS AVAILABLE

Georgia: Traffic investigations and reports — Contact: Mr. Roy Flynt, State Director, Division of Highway Planning, Atlanta, Georgia.

Indiana: Several openings for Traffic Engineers—Minimum $350.00 per month.
Contact: Mr. John Lauer, Chairman, State Highway Commission, State House Annex, Indianapolis, Indiana.

Louisiana: Several openings—Civil Service.
Highway Traffic Engineer—Grade I—$225-$300.00 per month.
Supervising Traffic Engineer—Grade II—(T. E. Plan. Sect.) $350.00-$450.00 per month.
Principal Asst. to Traffic Planning Engineer—Grade IV—$400.00-$525.00 per month.
Admin. Traffic and Plan. Sect., Department of Highways—Grade V—$475.00-$575.00 per month.
Contact: Mr. I. L. Thomas, Traffic & Planning Engineer, Department of Highways, Baton Rouge, Louisiana.

New York: Must be resident of New York State.
Junior Civil Engineer (Planning)—$2400.00 with bonus, $2980.00 per year.
Asst. Civil Engineer (Traffic)—$3120.00 with bonus, $3681.60 per year.
Contact: Mr. Fred W. Fisch, Dept. of Pub. Wks., 353 Broadway, Albany, N. Y.

Washington: District Traffic Engineer — $350.00-$400.00 per month.
Contact: Mr. D. E. Morris, Traffic Engineering, Department of Highways, Transportation Building, Olympia, Washington.

Fort Worth: Traffic Engineer, Department of Public Works——$5000.00 per year.
Contact: W. O. Jones, Acting City Manager, Ft. Worth, Texas—**State resident preferred.**

Nashville: Asst. City Traffic Engineer — $3300.00-$3600.00 per year.
Contact: W. H. Mann, Traffic Engineer, City Market House, Nashville, Tenn.

Capitol Transit Co., Washington, D. C., Junior Traffic Engineer—$200.00-$250.00 per month.
Contact: Mr. John B. Ecker, Director, Research & Planning, Capitol Transit Company, 36th and M Sts., N.W., Washington 7, D. C.

Philadelphia Transportation Co., Philadelphia, Pa., Junior Transportation Engineers — $200.00-$225.00 per month.
Contact: Mr. G. H. Smith, Staff Engineer, Philadelphia Transportation Company, Philadelphia, Pa.

Associated Consultants, Evanston, Illinois: Junior Traffic Engineer.
Contact: George W. Barton, Engineering Director, Associated Consultants, 1704 Judson Avenue, Evanston, Illinois.

Sales Representatives for manufacturer of a complete line of plain and reflectorized traffic signs and street name plates. Open territories include New England States, Delaware, Maryland, Virginia, Wisconsin, Iowa, Missouri, Texas, New Mexico, Kansas and Nebraska. Agents operate on a commission basis.
Contact: Institute of Traffic Engineers, 212 Strathcona Hall, New Haven 11, Connecticut, for further information.

INSTITUTE LUNCHEON

Participants in an Institute luncheon held during the Ninth National Traffic Training Institute in Atlanta were: David M. Baldwin, Donald S. Berry, Burton W. Marsh, Elmer Transeau, Wilbur S. Smith, Robert S. Holmes, Elroy L. Ericksen, Lawrence S. Tuttle, George T. Papageorge, Karl A. Bevins, Harry Howard, Jr., Thomas P. Walbert, Robert A. Burch, Paul L. Ristroph, Allan R. Pepper, F. M. Kreml, Fenton G. Jordan, Jr., Charles S. LeCraw, Jr., Norman Damon.

Guests included: Bob Glenn, Professor of Hwy. Engineering, Oregon State College, Corvallis, Oregon; Claude McCamment, Safety Engineer, Kansas State Highway Commission, Masonic Temple Building, Topeka, Kansas.

LAW JOINS N. Y. PORT

The appointment of Hervey F. Law as General Superintendent of Airports of The Port of New York Authority was announced recently by Howard S. Cullman, chairman of the authority.

Mr. Law, who is the country's best-known airport manager, is one of the principal speakers listed for this year's annual ITE meeting in Detroit. He has won wide renown as the head of the unique Washington National Airport which is considered the best-run air terminal in the country today. Air-minded since he soloed in a glider of his own construction in 1914, Mr. Law has been credited with increasing the income at the only federally-owned and operated commercial airport in the United States from $443,000 a year in 1943 to $838,000 in 1946.

(MATSON, Cont. from Page 498)

neering (they kept their promise), at the end of the academic year. It seems the profs. thought that his education was complete and that he ought to take a job at expenses with Frank G. Baum, a consulting engineer in San Francisco. His first assignment was to assist in research of the flash-over problem of high tension transmission lines, but the boss got sick by the end of the year and Ted went to work with the Pacific Gas and Electric Company the next year. After an assignment of transmission towers in the mud of San Francisco Bay, they routed him up to the poison oak and rattle snakes in Chico Canyon replacing flume structures. He got tired of that in a hurry and later that year (1926) he took his first assignment in traffic with Miller McClintock which was a traffic survey job, culminating in a 350 page report on "The Street Traffic Control Problem of San Francisco", which was published the following year. About this same time he was married to Naomi Robinson.

After a couple of months' assignment with the Los Angeles Traffic Commission on some traffic signal timing work, Ted Matson again returned to San Francisco to work with Harland Bartholomew and his associates on a major street plan for that city. When this plan was completed he accepted a job for a city-wide traffic survey in Kansas City, Missouri, and was counting traffic about the time the bubble burst in the fall of 1929. After getting Tom Seburn started in traffic in Kansas City, Ted went to work with Burt Marsh in Philadelphia, just as the depression was underway in 1930. After a couple of years, Burt joined the 3 A's and left the job to Ted. In January, 1936, Ted Matson again pulled up stakes and rejoined Miller McClintock, this time as a field man for the Bureau for Street Traffic Research. He was assigned work with the New York

Here's *the answer* to your off-street parking problem

PARK-N-LOT*

THIS NEW 10-HOUR MODEL OF PARK-O-METER WILL FINANCE MUNICIPAL PARKING LOTS AND SOLVE EVERY OFF-STREET PARKING PROBLEM

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Automatic Park-N-Lot* Meters, embodying the same time-proved mechanism employed in the famous Park-O-Meters, provide a permanent solution to all off-street parking problems. They pay for themselves quickly; pay for the parking facilities; then continue to bring in revenue.

Fully variable to meet every coin and time combination that may be required.

TYPICAL OPERATING PLAN

FRINGE AREA	BUSY AREA
2 hours, 1 nickel	1 hour, 1 nickel
4 hours, 2 nickels	2 hours, 2 nickels
6 hours, 3 nickels	3 hours, 3 nickels
8 hours, 4 nickels	So on through 10 hours
10 hours, 5 nickels	5 hours, 1 quarter
10 hours, 1 quarter	10 hours, 2 quarters

* REGISTERED TRADE MARK U.S. PAT. OFF.

Deliveries Now Being Made
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Police Department, which was running a heavy W.P.A. roll at that time. The fall of that year McClintock asked him to go back to San Francisco in connection with some of the downtown problems which were created by the new bridges coming in from Oakland and Sausalito. Here again major reports of highway improvements were proposed for San Francisco by July, 1937, and Ted was asked to go to Harvard and teach school under Max Halsey. After a year at Harvard, they moved the Bureau to Yale and Ted kept right on teaching traffic engineering for the next three years. Then the war broke out and school teaching stopped. While still maintaining his university status, he was kept busy with various war-time highway transportation problems involving consulting work with the military and civil agencies.

He assumed Directorship of the Bureau in 1943 and besides teaching his second class since the resumption of peace, he is busily engaged in guiding the education and research work of the Bureau. He is also Chairman of the Parking Committee of the Highway Research Board, and serves on the Vehicle Characteristics Committee of that Board. He is a member of the Education, Program, and Handbook Committees of the I.T.E., is a consultant to the Eno Foundation, and serves on the Joint-Committee on Traffic Engineering Techniques and Administration.

In addition to the reports mentioned above, Ted Matson has written several technical articles on traffic signal timing, intersection re-design, preliminary drafts on Army Field Manual 25-10, municipal traffic administration, etc. He believes he is among the first "guys" who drew accumulation curves for cordon counting and who utilized the time-space diagram for signal timing. He also takes pride in the medial separation divider which is growing in use, and shares responsibility with others on a variety of committee reports. He has lectured at diverse traffic engineering institutes and training schools since 1937, and, while he is not much of a "joiner", in addition to membership in the Institute of Traffic Engineers, he is a member of the Society of Sigma Xi, the A.P.W.A., S.A.E., Highway Research Board, etc. He likes to shoot golf, along with the "bull", and plant posies in the garden. He is the proud papa of one daughter, Mary Jane.

POSITION, DAMAGES AWARDED FEUCHTER

Circuit Judge Joseph J. Ward at St. Louis, Mo., ruled reently that Joseph J. Feuchter (Mem., ITE) is entitled to reinstatement in the same job classification in the St. Louis Department of Streets and Sewers that he held when he was granted a leave of absence as city traffic engineer to enter military service on November 21, 1942.

Judge Ward directed Arthur C. Meyers, Director of Streets and Sewers, to reinstate Feuchter at a salary of $400 a month, and ordered the payment of $4,416 back pay from June 28, 1946, when Feuchter unsuccessfully sought reinstatement, and in addition he awarded Feuchter $7,500 in damages. The position of traffic engineer at present is held by Thomas Watts, who qualified for the post in civil service examinations.

Judge Ward said that he based his ruling on Feuchter's status under the St. Louis civil service system and the Selective Service Act which guaranteed Feuchter, as a veteran, reinstatement to his old job or a similar one. The award of $7,500 damages was based on the damages to Feuchter's reputation by the "wrongful and unlawful acts of the defendants in failing to reinstate him."

Engr. News-Record

VOTE HIGHWAY PROGRAM

Governor Earl Warren has signed a bill approving a state-wide program of highway construction and improvement in California and setting up increased user taxes and fees to help finance it. The program, as finally adopted, is a modification of recommendations incorporated in the Collier Committee report prepared last year after a fact-finding study in which the Automotive Safety Foundation participated as engineering consultants.

New highway revenues totaling $64,000,000 annually are provided through an increase of 1½ cents in the gasoline tax, increases in truck fees and motor vehicle registration fees, and a new driver license fee of $2 for four years.

It is estimated the bill will raise from present and new taxes about $91,000,000 a year in construction money, of which $18,500,000 goes for city streets and county roads.

ON THE SHELF

Dudley Noble, a British subject, has written an unusual book entitled "*The Book of Road Signs*". Non-technical, this English publication is just light enough to amuse traffic engineers. It sells for 2s6d, and is available from Wm. Clowes & Sons, Ltd., Little New St., London, EC 4.

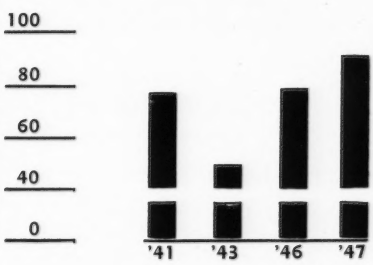
Traffic engineers interested in signs may read about the international sign system and enjoy a discussion of U. S. and Canadian road signs which receive considerable praise from the author. As a matter of fact, Mr. Noble contends that the United States is so well signed that there is never a doubtful point in the country.

Of historical interest are the descriptions of the "London Stone" and the origin of the "mile". Both are believed to have been of Roman orig'n. The stone is located in the heart of London and was the key to the Roman milliaries on the roads leading out of the city. The word "mile" is derived from the Roman *millia passum*—a thousand paces (at more than five feet per pace.

During his visit to America, Mr. Noble was apparently highly impressed with signs reading "soft shoulders" and "no parking on pavement". Believing these were closely associated, Mr. Noble proudly displays a car parked in the appropriate place—*on soft shoulders.*—ROS.

"How to Make a Two-Man Business District Parking Survey" by Henry K. Evans, Director, Traffic Engineering Division, National Conservation Bureau. Details of spot-check method for evaluating the seriousness of the parking problem by measuring the major "parking disease" in a given business area. National Conservation Bureau, 60 John St., N. Y. 7,—7 pages, printed free.

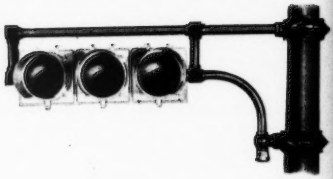
TRAFFIC TRENDS

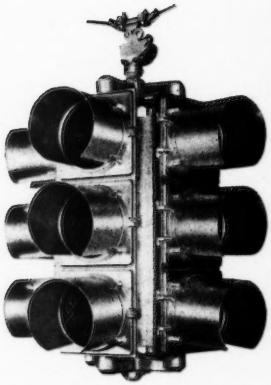


TRAVEL ON RURAL ROADS FOR FIRST SIX MONTHS OF 1941, 1943, 1946 AND 1947.

[Based on Public Roads Administration Data]

√CHECK
EXAMINE!
COMPARE





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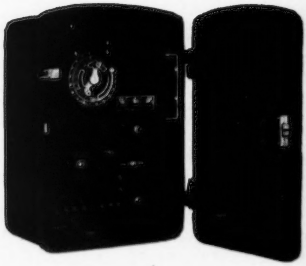

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